

Docket No.: 2328-023RI

7/16/03
7/29/03
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Application of

DUANE C. GATES

U.S. Patent Application No. 09/534,814

: Group Art Unit: 3742

Filed: March 22, 2000

: Examiner: PASCHALL, MARK H.

For: SEGMENTED COIL FOR GENERATING PLASMA IN PLASMA PROCESSING EQUIPMENT

RESPONSE TO OFFICE ACTION

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Sir:

This paper is submitted in reply to the Office Action mailed February 28, 2003, which was made Final.

Applicant submits herewith with a statement under 37 CFR 3.73 (b), as signed by a person authorized to act on behalf of the assignee, LAM Research Corporation.

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As a result of the rejections under 35 USC 251 and 35 USC 112, paragraph 1, Applicant submits herewith the Declaration of Roger Patrick, who is qualified to testify about the knowledge of those with ordinary skill in the art at the time the original application was filed in 1994. Dr. Patrick has supervised persons working in the plasma processing field since 1986 and has worked in the field for almost two decades, starting in 1984.

Dr. Patrick has testified that those of ordinary skill in the art in 1994 would have known: (1) the interior portion of the coil illustrated in Figure 4 or 5, inside of circle B of Exhibit A accompanying his Declaration, produces magnetic flux having greater density than is produced by the intermediate portion of the coil between the circles A and B of Figures 4 and 5 if switch S1 of Figure 4 is open and switch S2 of Figure 5 is connected to the outer terminal of coil portion 52; (2) the exterior portion of the coil of Figure 4 or 5, beyond circle A, produces magnetic flux having greater density than the intermediate portion under the described conditions; (3) the amount of magnetic flux produced by a particular coil arrangement is directly related to the number of turns of the coil arrangement and the amount of current flowing through the coil; (4) when the coils of Figures 4 and 5 are connected as described, the interior, intermediate and exterior portions of the coils are connected in series so that the current which flows from a terminal at the interior of the coil to a terminal at the exterior of the coil has only one path; (5) there might be transmission line effects due to the lengths of the coils between the interior and exterior terminals thereof relative to the wavelength of the RF source; (6) the transmission line effects might cause the current in different parts of the coil to be slightly different from each other; (7) the transmission line effect is not sufficiently great to cause the magnetic flux density in the intermediate portion of the coil to exceed the magnetic flux density in the interior and exterior coil portions; (8) the interior and peripheral portions of the coils of Figures 4 and 5, when connected as previously stated, includes plural radially and circumferentially extending turns; (9) the intermediate portion of the coils of Figures 4 and 5, between the interior and peripheral portions thereof, does not include a complete turn and includes a lead having a straight

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portion; (10) the coils couple RF fields to the plasma; and (11) the coils produce RF magnetic fields, as well as RF electric fields that are coupled from one portion of the coil into the plasma and back to another portion of the coil. Dr. Patrick has given cogent reasons for his conclusions based on the facts set forth in his Declaration.

Based on the foregoing, Applicant traverses the rejections of claims 39-58 under 35 USC 251 and 35 USC 112, first paragraph. As discussed *supra* and as testified by Dr. Patrick, those of ordinary skill in the art would have known that the requirements of these claims are inherent. Dr. Patrick's testimony has provided a basis in fact and technical reasoning as to why the claimed features are inherent and necessarily flow from the Gates disclosure and why those of ordinary skill in the art would have recognized the claimed features as being necessarily inherent. Because of this inherency, it is not necessary for applicant to point out the portions of the Gates application which includes the limitations of claims 39-58.

Applicant traverses the rejection of claims 39-58 as being obvious as a result of Hama, et al., US Patent 5,525,159. Attorney for applicant has carefully reviewed the Hama, et al. patent and finds no basis to support the Examiner's position that Hama, et al. "teaches more current flow the peripheral portion of the coil then to the center portion of the coil" (sic). The Examiner apparently relies on inherency because he says "it is obvious that this effect results in a more intense magnetic flux at the peripheral portion of the plasma, as claimed." In the first full sentence on page 6 of the Office Action, the Examiner states:

It should be noted that the electromagnetic fields (Hama, et al.) generated could be varied by the distance of the individual coil segments relative to the chamber bottom and relative to each other.

The foregoing sentence indicates that the Examiner, in considering Hama, et al., has not followed the requirements of the law with regard to inherency. The fact that a certain result of

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characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Riejckaert*, 9F.3d 1531, 1534, 28 USPQ 2d 1955, 1957 (Federal Circuit 1993); *In re Oelrich* 666 F2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981.) To establish inherency the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy* 17 USPQ 2D 1461, 1464 (Board of Patent Appeals and Interferences 1990). To establish inherency, the Examiner must present evidence or cogent reasoning to make it clear that the descriptive matter missing from the reference is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. Inherency may not be established by probabilities of possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *In re Robertson*, 169 F3rd 743, 745, 49 USPQ 2d 1949, 1950-51 (Federal Circuit 1999).

The Examiner has completely failed to show that Hama, et al. necessarily has a coil including interior, intermediate and peripheral portions having turns connected to each other and arranged so the magnetic flux density coupled to the plasma by each of the interior and peripheral coil portions exceeds the magnetic flux density coupled to the plasma by the intermediate coil portion, as required by claims 39 and 45. His previously quoted statement makes it clear that Hama, et al. does not necessarily have such a coil. The Examiner has also failed to point out how Hama, et al. includes plural radially and circumferentially extending turns, wherein an exterior segment has at least one circumferentially extending turn, and an intermediate portion is configured so it does not include a complete turn, is substantially less than a complete and includes a lead connected to ends of the turns of the interior and exterior portions and that has a straight portion, as required by claims 53 and 54.

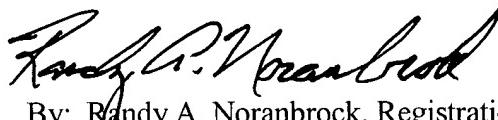
In view of the foregoing amendments and remarks, favorable reconsideration and allowance are respectfully requested and deemed in order.

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To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayments to Deposit Account 07-1337.

Respectfully submitted,

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